

EOS Production Sites Network Performance Report: November 2013

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. **Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.**

Highlights:

- **Mostly stable flows**
 - **GPA: 3.71 ↓** (was 3.79 last month).
- **Requirements:** from the Network Requirements Database
- **LaRC ASDC Outflow:** Mostly stable again: congestion only infrequently reducing performance
- **2 flows below Good**
 - LaRC ASDC → JPL: **Adequate**
 - GSFC → EROS: **Almost Adequate**

Ratings Changes:

Upgrade: ↑: None

Downgrades: ↓:

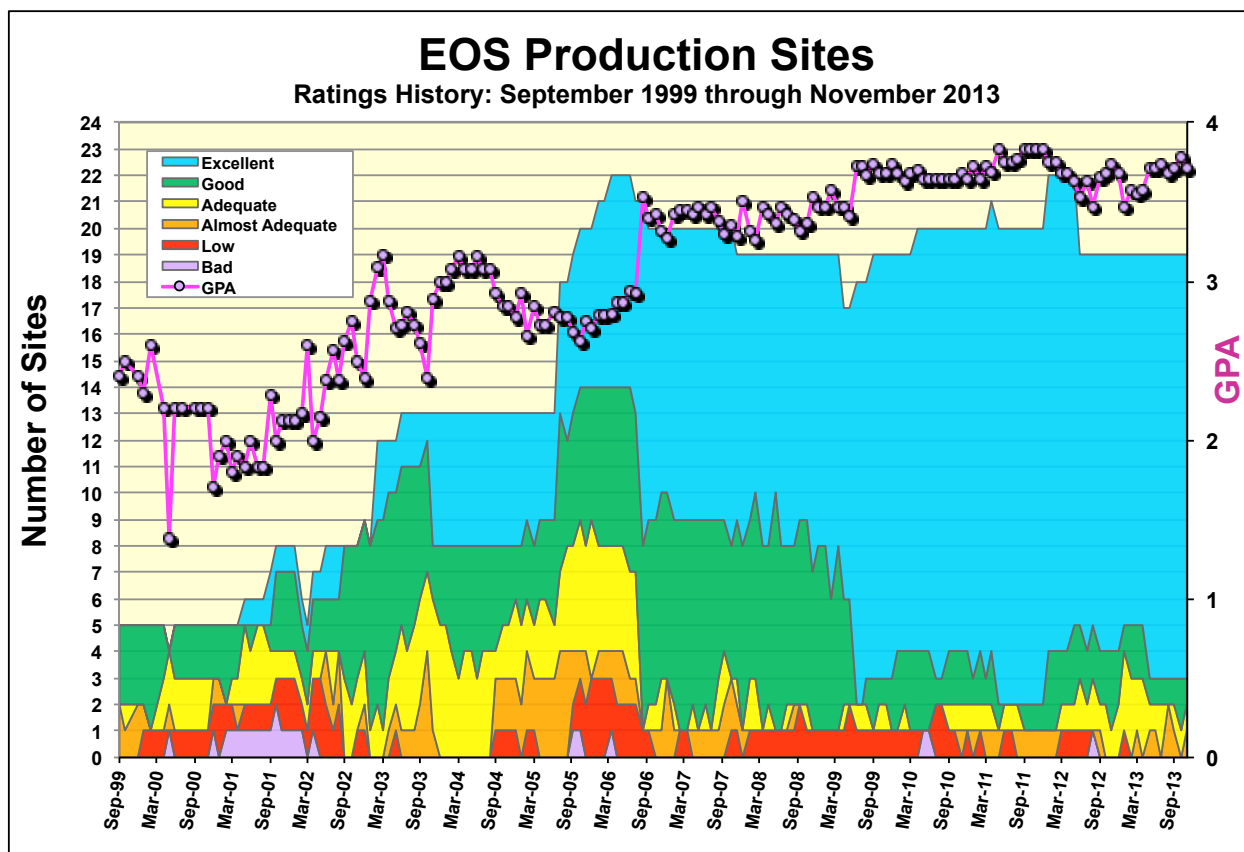
- GSFC → EROS: **Good** → **Almost Adequate**
(Thruput was higher in October due to lower congestion during the federal shutdown)

Ratings Categories:

Rating	Value	Criteria
Excellent:	4	Total Kbps > Requirement * 3
Good:	3	1.3 * Requirement <= Total Kbps < Requirement * 3
Adequate:	2	Requirement < Total Kbps < Requirement * 1.3
Almost Adequate:	1.5	Requirement / 1.5 < Total Kbps < Requirement
Low:	1	Requirement / 3 < Total Kbps < Requirement / 1.5
Bad:	0	Total Kbps < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that "**Almost Adequate**" implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:

The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

- 2011 April: Added RSS to GHRC
- 2011 May: Deleted WSC to ASF for ALOS
- 2012 January: Added NOAA → GSFC-SD3E
Added GSFC-SD3E → Wisconsin
- 2012 June: Deleted GSFC → LASP
Deleted GSFC ← → JAXA

Requirements Basis:

In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. EOSDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.

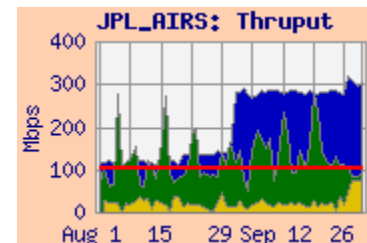
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

Integrated Charts:

Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf throughput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.

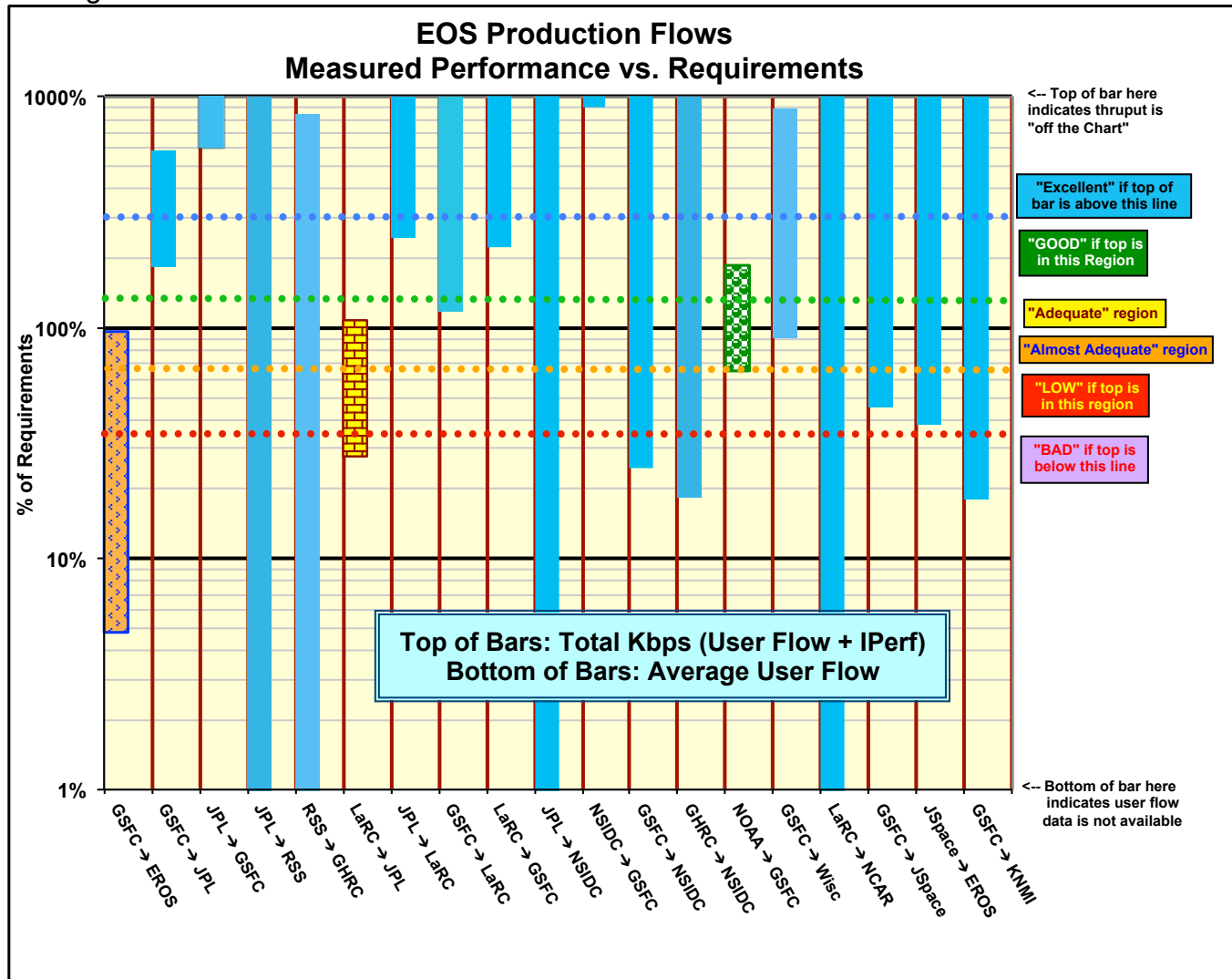


Network Requirements vs. Measured Performance

November 2013		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current	Old	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements	
		Database	HB 1.4.3+					This Month	Last Month
GSFC → EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR → EROS LPDAAC	26.3	504.3	528.7	A A	Good
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS1 → JPL-AIRS	116.2	342.3		Excellent	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	3.4	213.7	213.8	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		21.8		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.34	RSS (Comcast) → GHRC (UAH)		2.69		Excellent	Ex
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	23.2	90.1		Adequate	Adq
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	2.69	139.8		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GSFC EDOS → LaRC ASDC	61.4	830.2	833.1	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	1.24	908.8	908.8	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		403.8		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	2.37	877.6	877.8	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	2.07	418.6	418.6	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC	0.08	20.0	20.0	Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	340.2	927.3	974.8	Good	Good
GSFC → Wisc	NPP, MODIS, CERES, AIRS	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	235.4	2265.5	2314.1	Excellent	Ex
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		166.9		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	6.91	Testing discontinued: 31 March 2009		n/a	n/a
JAXA → GSFC	AMSR-E	0.16	0.1	JAXA → GSFC	1.03			n/a	n/a
GSFC → JSpace	ASTER	6.75	5.4	GSFC-EDOS → JSpace-ERSD	3.05	122.0	122.0	Excellent	Ex
JSpace → EROS	ASTER	8.3	8.3	JSpace-ERSD → EROS PTH	3.18	114.3	114.3	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	2.41	278.6	278.6	Excellent	Ex
		Significant change from HB v1.4.3 to Requirements Database						Ratings Summary	
		Value used for ratings						Database Req	
								Score	Prev
*Criteria:	Excellent	Total Kbps > Requirement * 3				Excellent		16	16
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3				Good		1	2
	Adequate	Requirement < Total Kbps < Requirement * 1.3				Adequate		1	1
	Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement				Almost Adequate		1	0
	Low	Requirement / 3 < Total Kbps < Requirement / 1.5				Low		0	0
	Bad	Total Kbps < Requirement / 3				Bad		0	0
						Total Sites		19	19
Notes:	Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP				GPA		3.71	3.79	



This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.



1) EROS:

Ratings: GSFC → EROS: ↓ **Good** → **Almost Adequate**
 ERSDAC → EROS: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

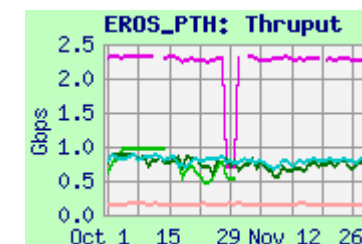
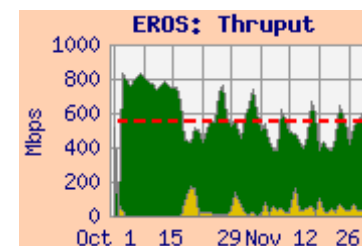
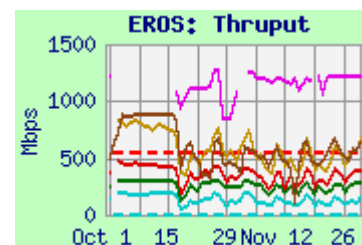
Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	691.9	504.3	253.9	26.3	528.7
GSFC-EDOS → EROS LPDAAC	287.4	251.3	96.4		
GES DISC → EROS LPDAAC	409.1	344.4	133.1		
GSFC-ENPL → EROS LPDAAC	1233.9	1195.2	973.9		
JSpace-ERSD → EROS LPDAAC	179.8	114.3	45.7	3.18	114.3
NSIDC SIDADS → EROS PTH	649.7	515.2	326.5		
GSFC-ENPL → EROS PTH	2320.6	2284.2	2122.0		
GSFC-ENPL → EROS PTH (IPv6)	n/a	n/a	n/a		
GSFC-NISN → EROS PTH	876.2	790.0	434.3		
ESDIS-PS → EROS PTH	854.7	717.4	339.9		
LaRC PTH → EROS PTH	177.2	158.7	114.7		

Requirements:

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Almost Adequate
ERSDAC → EROS	FY '06 -	8.33	8.3	Excellent

Comments: **1.1 GSFC → EROS:** The rating is based on the **MODAPS-PDR** Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was increased 60% in June '12, switching to the requirements database, based primarily on increased MODIS reprocessing. The average user flow this month is only about 5% of the new requirement (low even with no reprocessing flows). The median integrated thrupt from **MODAPS-PDR** to LPDAAC increased substantially in October, due to reduced congestion during the government shutdown. **When the shutdown ended, congestion returned, and thrupt dropped back to previous levels.** Median integrated thrupt this month was again slightly below the requirement, so the rating drops back to **Almost Adequate**. Thrupt from **GSFC-EDOS** and **GES DISC** (also on EBnet) also dropped back to more typical levels. The route from EBnet sources is via the Doors, to the NISN 10 gbps backbone, to the NISN Chicago CIEF, then via GigE, peering at the StarLight Gigapop with the EROS OC-48 tail circuit.



Iperf testing for comparison is performed from **GSFC-ENPL** to both LPDAAC (the "FTL" node, outside the EROS firewall, which was down during the shutdown) and to EROS-PTH (both 10 gig hosts) using both IPv4 and IPv6. The route from **GSFC-ENPL** to EROS is via a direct 10 gig connection to the MAX, to Internet2, to StarLight in Chicago. **GSFC-ENPL** (IPv4) to EROS-PTH now typically gets over 2 gbps. This shows that the capacity of the network is well in excess of the requirement – it would be rated **Excellent**. IPv6 tests were down in November (restored in December).

1.2 JSpace-ERSD → EROS: **Excellent**. See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance also improved during the shutdown, and returned to normal afterwards.

1.4 LaRC → EROS-PTH: The thrupt from **LaRC-PTH** to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. **Note that LaRC-PTH outflow is limited to 200 mbps by NISN at LaRC.**

2) to GSFC**2.1) to NPP, GES DISC, etc.**Ratings: NOAA → NPP SD3E: Continued **Good**NSIDC → GES DISC: Continued **Excellent**LDAAC → GES DISC: Continued **Excellent**JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml<http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtmlhttp://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	937.1	927.3	898.6	340.2	974.8
EROS LPDAAC → GES DISC	536.4	322.3	153.1		
EROS PTH → GSFC-ESDIS PTH	712.6	444.4	96.8		
JPL-PTH → GSFC-ESDIS PTH	92.2	92.1	91.9	3.44	
JPL-TES → GSFC-NISN	457.2	222.3	76.3		
LaRC ASDC → GES DISC	922.7	908.8	645.3	1.24	
LARC-ANGe → GSFC-ESDIS PTH	936.6	932.7	916.5		
NSIDC DAAC → GES DISC	902.3	877.6	689.1	2.30	
NSIDC DAAC → GSFC-ISIPS (scp)	34.8	34.1	23.9		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	Excellent
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	Excellent
JPL → GSFC combined	CY '12 –	0.57	3.2	Excellent
NOAA → NPP SD3E	CY '12 –	522.3	615.6	Good

Comments:

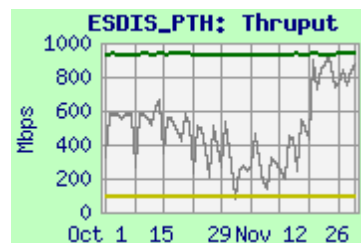
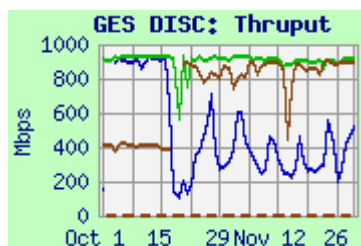
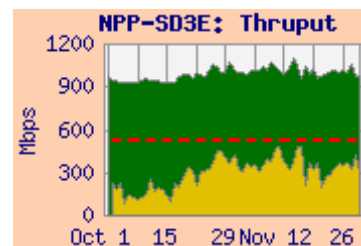
NOAA → NPP-SD3E: Performance from **NOAA-PTH** to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the Gig-E interface on the NOAA side test machine (the circuits are all 10 gbps). User flow was close to usual, very close to the requirement without contingency.

EROS LPDAAC, EROS-PTH → GSFC: The thrupt for tests from **EROS** to **GES DISC** and from **EROS-PTH** to ESDIS-PTH were again more noisy after the shutdown ended.

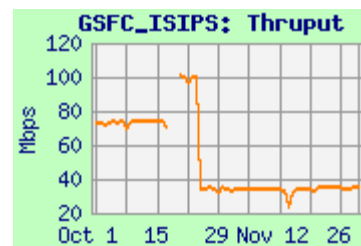
JPL → GSFC: Thrupt from **JPL-PTH** is limited by the Fast-E interface on **JPL-PTH**. With the modest requirement the rating remains **Excellent**. The 3.4 mbps average user flow was close to typical and the old requirement, and well above the new [reduced] requirement. Testing from JPL-TES to GSFC-NISN (not graphed) more clearly shows the capability of the network.

Note that JPL → EBnet flows take Internet2 instead of NISN, based on JPL routing policies.

LaRC → GSFC: Performance from **LaRC ASDC** to GES DISC was not very noisy this month (as it had been previously), due to reduced congestion at ASDC. Thrupt from **LaRC ANGe** to ESDIS-PTH was more stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was well above the requirement.



NSIDC → GSFC: Performance from **NSIDC** to GES DISC improved in mid October, due to an upgraded host at NSIDC. It was way above the tiny requirement, so the rating remains **Excellent**. The user flow was again well above both the old and lower new requirement. **Thruput to GSFC-ISIPS using SCP** (iperf testing still down after reconfiguration due to blocking) initially improved with the new host at NSIDC, but then dropped with an ISIPS host upgrade. It remains well above the requirement.

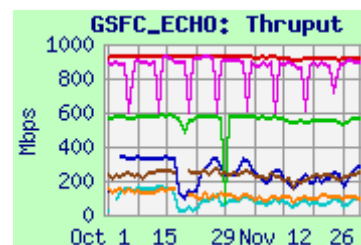


2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfcc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	297.4	218.7	137.1
EROS LPDAAC ftp	130.8	71.8	30.5
GES DISC	934.0	918.8	885.3
GES DISC ftp	935.7	882.8	486.5
LaRC ASDC DAAC	581.6	560.6	471.4
NSIDC DAAC	256.6	222.6	156.7
NSIDC DAAC ftp	175.1	101.2	40.8



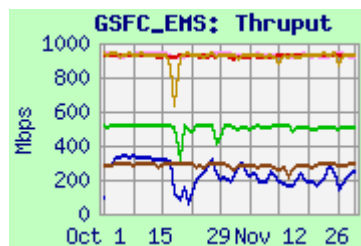
Comments: Performance was mostly stable from all sites. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfcc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	282.3	204.9	127.5
ESDIS-PTH	937.0	926.9	705.0
GES DISC	935.3	928.9	544.9
LARC ASDC	519.7	504.4	329.0
MODAPS-PDR	937.6	928.5	517.8
NSIDC-SIDADS	287.0	282.8	233.2



Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only. Performance from **EROS LPDAAC** improved during the shutdown, but resumed its noisy pattern after the shutdown ended. Performance was quite stable from other sources.

3) JPL:

3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml
http://ensight.eos.nasa.gov/Organizations/daac/JPL_SMAP.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E-OPS1 → JPL-AIRS	543.8	342.3	193.8	116.2	369.9
GSFC-GES DISC → JPL-AIRS	219.0	175.6	126.8		
ESDIS-PTH → JPL-AIRS	351.2	230.8	106.5		
GSFC-NISN → JPL-AIRS	132.6	45.7	25.2		
NPP IDPS-Mini-inf → JPL-Sounder	133.7	99.5	56.8		
GSFC-NISN → JPL-Sounder	214.0	107.9	47.5		
ESDIS-PTH → JPL-MLS	493.4	417.9	247.5		
GSFC-NISN → JPL-MLS	456.2	295.8	110.0		
ESDIS-PTH → JPL-PODAAC	154.7	114.6	56.8		
GSFC-NISN → JPL-PODAAC	100.8	68.8	30.6		
MODAPS-PDR → JPL-PODAAC	76.9	52.0	19.6		
ESDIS-PS → JPL-QSCAT	92.8	91.4	80.3		
GSFC-NISN → JPL-QSCAT	73.9	69.0	50.6		
GSFC-EDOS → JPL-SMAP	484.7	230.8	79.9		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	63	116.7	Excellent
GSFC → JPL AIRS	CY '12-	40	98	Excellent
GSFC NPP → JPL Sounder	CY '12-	15	15	Excellent
GSFC → JPL MLS	CY '12-	1.0	2.1	Excellent

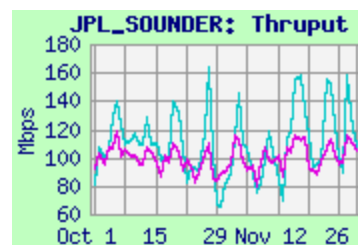
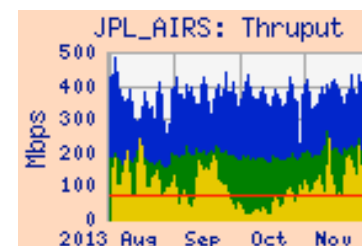
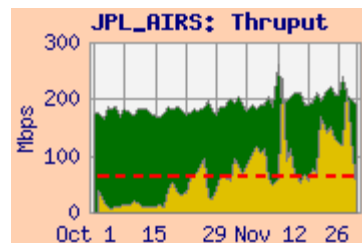
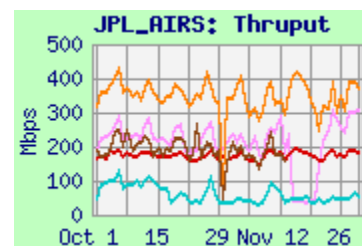
Comments:

AIRS , Overall: The requirements were switched in June '12 to use the requirements database, instead of Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

The AIRS tlcf node was moved to a new location in June 2013. When testing resumed about 2 weeks later, throughput was significantly lower from all sources. But the integrated throughput from **NPP-SD3E-OPS1** remained above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

The **JPL overall rating** is also based on the **NPP-SD3E-OPS1** to JPL AIRS throughput, compared with the sum of all the GSFC to JPL requirements. The median throughput remained above 3 x this requirement, so the overall rating remains **Excellent**. Note that the average user flow this month increased well above the requirement (with contingency) -- after last month's dip due to the shutdown.

NPP to JPL Sounder: Testing from both **NPP IDPS-Mini-inf** and **GSFC-NISN** to the JPL Sounder PEATE was noisy this month, with large diurnal variation, but mostly stable.



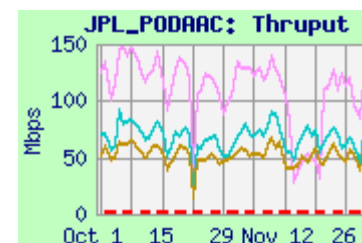
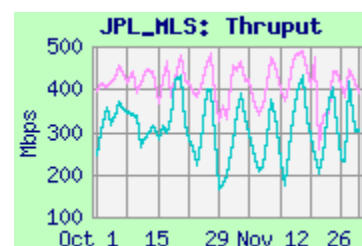
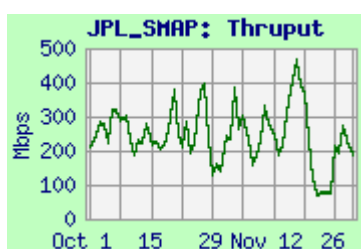
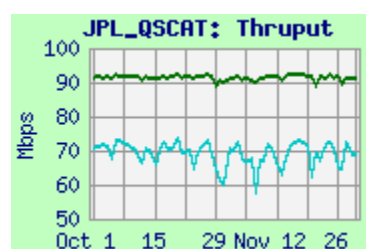
3.1) GSFC → JPL: continued

MLS: Thruput from both **ESDIS-PTH** and **GSFC-NISN** experienced diurnal congestion this month. Both were way above the modest requirement, so the rating remains **Excellent**.

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But **performance was mostly stable**; thuput was way above the previous 1.5 mbps PODAAC requirement.

QSCAT: There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from **ESDIS-PS** and **GSFC-NISN** to QSCAT remains well above the modest previous 0.6 mbps requirement.

SMAP: There is no requirement from GSFC to JPL SMAP in the database. Thuput from **EDOS** to SMAP was noisy.

**3.2) JPL → LaRC**

Rating: Continued Excellent

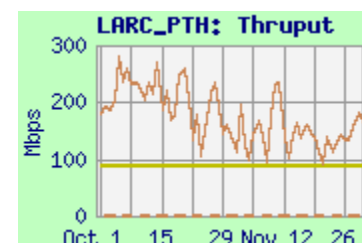
Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
JPL-PTH → LaRC PTH	88.9	88.8	88.6	2.69
JPL-TES → LaRC PTH	290.8	139.8	69.7	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	Excellent



Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. The route from JPL to LaRC is via NISN PIP. This month the thuput from **JPL-TES** was again noisy but remained much higher than the requirement; the rating remains **Excellent**. The user flow this month was more than double the 1.1 mbps requirement and above last month's 2.0 mbps average flow.

Thruput from **JPL-PTH** to LaRC-PTH has been stable at the higher of its two common states (88 mbps) since January 2013, when it switched from the lower of its two common states (60 mbps). It is limited by a Fast-E interface on **JPL-PTH** (upgrade in progress).

3.3) LaRC → JPL**Rating:** Continued **Adequate**

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtmlhttp://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtmlhttp://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
LaRC ASDC → JPL-MISR	79.6	49.0	27.7	2.4	49.0
LaRC PTH → JPL-MISR	78.0	39.8	25.1		
LaRC ASDC → JPL-TES	99.0	90.1	56.3		
LaRC ANGE → JPL-TES	356.4	297.0	195.2		
LaRC PTH → JPL-TES	180.8	150.8	95.9		
LaRC PTH → JPL-TES sftp	26.6	25.7	9.8	23.2	
LaRC ANGE → JPL-PTH	87.2	85.0	80.7		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Adequate
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Low
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

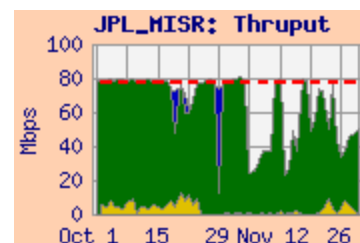
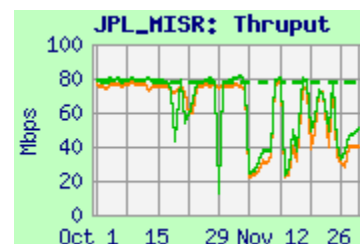
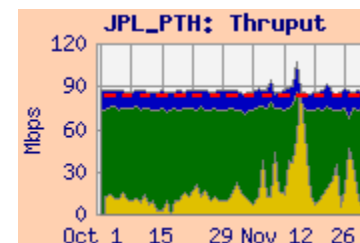
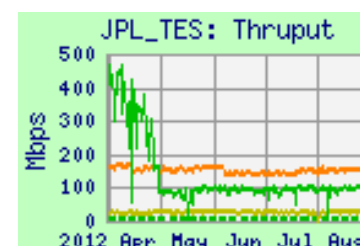
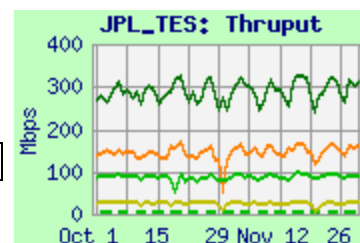
LaRC → JPL (Overall, TES): Performance from LaRC ASDC to JPL-TES was again mostly stable this month (although substantially below the throughput seen until April 2012). The median throughput was similar to last month, and remains [slightly] above the combined requirements, so the Overall rating remains **Adequate**.

The median throughput remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement), which increased this month with a big peak close to the requirement.

The true capacity of the network is better seen with the LaRC ANGe → JPL-TES throughput. The Overall rating based on this test would be **Excellent**. Performance from LaRC PTH to JPL-TES is stable, better than from LaRC ASDC, but is limited to 200 mbps by agreement with CSO / NISN.

LaRC → JPL (MISR): Throughput from LaRC ASDC to JPL MISR is limited by the Fast-E connection to the MISR node. User flow was below usual this month, and averaged only 3% of the requirement. Throughput to MISR became very noisy (again) in November, with the median from all sources dropping dramatically. The median integrated throughput decreased to slightly below 2/3 of the MISR requirement, so the MISR rating drops to **Low**. Since the congestion appears to be local to the JPL-MISR node, the overall LaRC to JPL rating was not reduced based on this problem.



4) GSFC → LaRC:**Rating:** Continued **Excellent**

Web Pages : <http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	935.1	933.5	585.6	61.4	933.7
GSFC-EDOS → LaRC ASDC	858.1	830.2	337.1		
ESDIS-PTH → LaRC-ANGe	921.5	896.7	681.1		
GSFC-NISN → LaRC-ANGe	900.1	852.2	656.3		

Requirements:

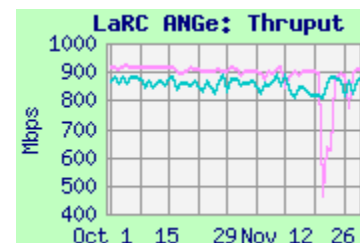
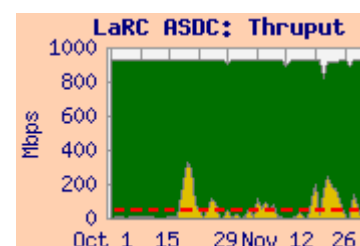
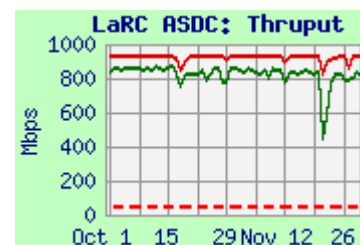
Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	Excellent

Comments:

GSFC → LaRC ASDC: Thruput from **GES DISC** to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, so the rating remains **Excellent**. Thruput to ASDC from GSFC-EDOS was noisier but mostly stable.

As seen on the integrated graph, the 61.4 mbps average user flow this month was [unusually] above both the requirement and last month's flow.

ANGe (LaTIS): Testing to ANGe ("Bob") from both **ESDIS-PTH** and **GSFC-NISN** was stable, close to the circuit limitation. (Note the expanded scale on the graph).



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
 JPL → NSIDC: Continued **Excellent**
 GHRC → NSIDC: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	598.2	418.6	383.2	2.1	418.6
GES-DISC → NSIDC DAAC	764.4	707.6	569.5		
GSFC-EDOS → NSIDC DAAC	233.7	230.6	159.6		
ESDIS-PTH → NSIDC DAAC	787.8	785.5	624.8		
GSFC-ISIPS → NSIDC (iperf)	253.4	248.8	209.0		
JPL PODAAC → NSIDC DAAC	513.9	403.8	288.0		
GHRC → NSIDC DAAC (nuttcp)	95.6	20.0	2.4	0.08	20.0
GHRC → NSIDC DAAC (ftp pull)	65.6	12.7	2.8		

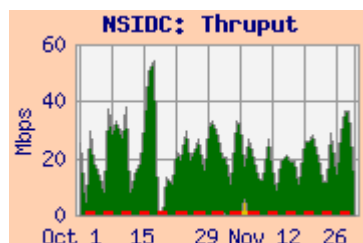
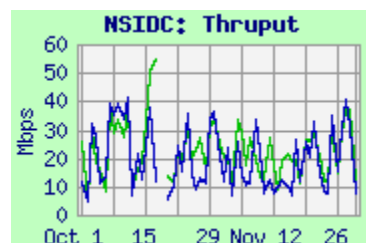
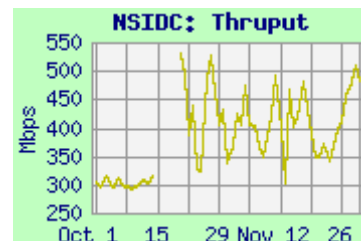
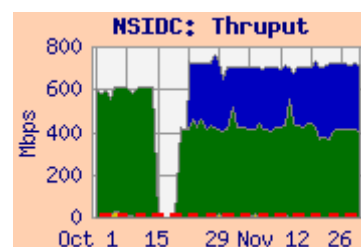
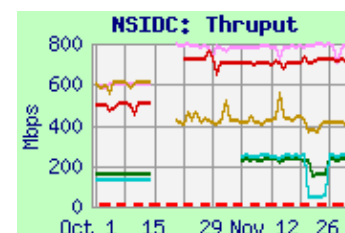
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	Excellent
JPL → NSIDC	CY '12 –	0.16	0.2	Excellent
GHRC → NSIDC	CY '12 –	0.46	0.5	Excellent

Comments: **GSFC → NSIDC S4PA:** The rating is based on testing from the **MODAPS-PDR** server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). The NSIDC test host was switched to an upgraded machine on 20 October; performance improved from most sources. The integrated thrupt from **MODAPS-PDR** dropped with the node switch (unlike all other sources), but remained well above 3 x the requirement, so the rating remains **Excellent**. The 2.1 mbps average user flow was about typical, but was below the requirement without contingency.

JPL PODAAC → NSIDC S4PA: This requirement was reduced from 1.34 mbps in May '09. Thrupt from **JPL PODAAC** to NSIDC improved in with the NSIDC node upgrade. The rating remains **Excellent**. Note the expanded scale on the graph.

GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. The median integrated thrupt was not affected by the NSIDC upgrade, but remained well above 3 x the 0.46 mbps requirement, so the rating remains **Excellent**.

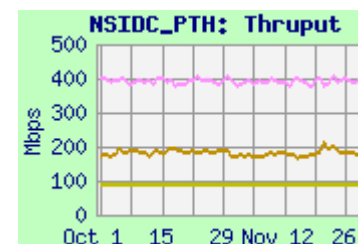
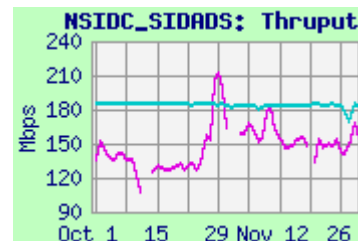


5) Boulder CO sites (Continued):**5.1) NSIDC:** (Continued):**Test Results: NSIDC-SIDADS, NSIDC-PTH**

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	190.4	153.3	117.7
GSFC-NISN → NSIDC-SIDADS	184.6	184.0	148.8
ESDIS-PTH → NSIDC-PTH	440.4	391.0	274.3
MODAPS-PDR → NSIDC-PTH	219.7	176.7	148.3
JPL-PTH → NSIDC-PTH	89.1	89.0	84.9

GSFC → NSIDC-SIDADS: Performance from **GSFC-NISN** to NSIDC-SIDADS was very stable. Performance from **GSFC-ENPL** to NSIDC-SIDADS improved at the end of October, due to changes at **GSFC-ENPL**. Note the expanded scale on the graph.

NSIDC-PTH: Thruput from all sources to NSIDC-PTH was very stable this month. **JPL-PTH** is limited by its Fast-E connection (upgrade in progress).

**5.2) LASP:**Ratings: LASP → GSFC: Continued **Excellent**

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml>

Test Results:

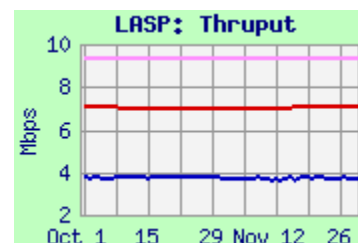
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.77	3.68	3.47
ESDIS-PTH → LASP blue (iperf)	9.38	9.38	8.80
GES DISC → LASP blue (iperf)	7.07	7.06	6.88
LASP → GES DISC	9.32	9.31	9.18

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	Excellent

Comments: In January '11, LASP's connection to NISN PIP was rerouted: it previously was 100 mbps from CU-ITS via NSIDC; it was changed to a 10 mbps connection to the NISN POP in Denver.

Iperf testing from **GES DISC** has been stable since mid February 2013, when it improved with the GES DISC firewall upgrade. Iperf and SCP testing from **ESDIS-PTH** was also very stable, and consistent with the circuit limitation, as was return testing from **LASP** to GES DISC, rating **Excellent**.



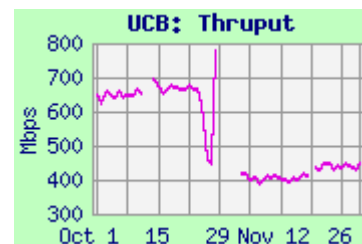
5.3) UCB:

Web Page <http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL	470.2	415.5	330.8

Comments: Testing to the 10 gig connected test node at UCB began failing consistently in mid-May 2013, so testing was switched to a 1 gig test node in mid-June. The route is via Internet2 to FRGP, similar to NCAR. Thruput dropped with the switch to a new ENPL VM, recovered with retuning in September, and dropped again in late October.



5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
GSFC → NCAR: Continued **Excellent**

Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	182.6	166.9	113.7
GSFC-ENPL-10G	5913.3	3959.7	1741.3
GSFC-ENPL-FE	94.8	94.5	93.7
GSFC-NISN	764.2	492.8	315.0

Requirement:

Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	Excellent
GSFC	CY '12 -	0.111	5.0	Excellent

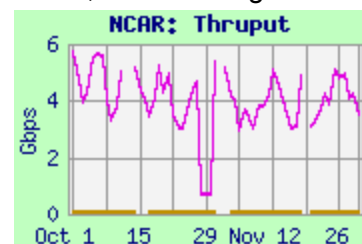
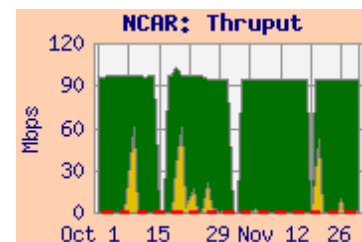
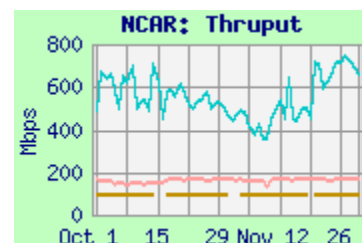
Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's 10 gigabit capable PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued.

From LaRC: Thruput from LaRC-PTH was well above 3 x the modest requirement, so the rating remains **Excellent**. Note that outflow from LaRC-PTH is limited to 200 mbps by NISN.

From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). Thruput remained noisy this month, but well above 3 x the requirement, so the rating remains **Excellent**. The average user flow from GSFC this month was 1.5 mbps, below last month's flow, but well above the revised requirement (including contingency)

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is noisy, and gets over 5 gbps on peaks.



6) Remote Sensing Systems (RSS):

Ratings: JPL → RSS: Continued

Excellent

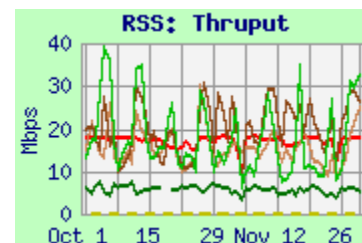
RSS → GHRC: Continued

Excellent

Web Page <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
JPL PODAAC → RSS (Comcast)	37.3	21.8	7.4
JPL TES → RSS (Comcast)	38.4	15.0	6.9
GSFC-NISN → RSS (Comcast)	18.5	17.5	11.3
GHRC-UAH → RSS (Comcast)	39.8	13.9	2.0
GHRC-NISN → RSS (Comcast)	9.2	5.6	1.8
RSS (Comcast) → GHRC (UAH)	4.74	2.69	0.59
RSS (Comcast) → GHRC (NISN)	3.82	2.98	0.84



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	Excellent
RSS → GHRC	CY '12 -	0.32	0.34	Excellent

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL). Note that AMSR-E is not operating at this time, so that data is not flowing. However, AMSR2 is operating on JAXA's GCOM-W1 spacecraft, and sending data to RSS (but this is not an EOS requirement).

At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing. Testing via the NISN circuit to RSS was discontinued at that time.

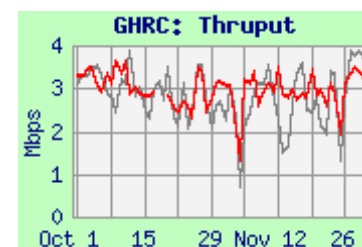
JPL → RSS: The median iperf from JPL PODAAC remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

GHRC → RSS: Testing from the UAH server at GHRC was noisy but stable, with significant diurnal variation. Testing from the NISN server at GHRC was a bit less noisy, but lower than from UAH.

GSFC → RSS: Testing from GSFC-NISN was quite steady this month. Previously, it had degraded around the beginning of June, indicating a peering problem between NISN and Comcast, but recovered at the end of June.

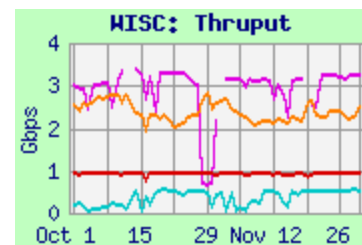
RSS → GHRC: The server at RSS on the Comcast circuit allows "3rd party" testing, as do the servers at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC.

The results to the two destinations are very similar. The performance from both sources remained well above 3 x the requirement, so the rating remains **Excellent**.

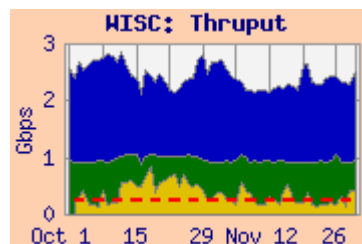


7) Wisconsin:Rating: Continued **Excellent**Web Pages <http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	2639.8	2265.5	1722.0	235.4	2314.1
GES DISC	935.2	919.4	781.4		
GSFC ENPL	3229.6	3143.7	2291.7		
LaRC ANGe	561.5	507.9	60.8		

**Requirements:**

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	Excellent
GSFC MODAPS	CY'12 -	21.9	16.5	Excellent
GSFC Combined	CY'12 -	259.1	253.7	Excellent
LaRC Combined	CY'12 -	n/a	7.9	n/a



Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

GSFC: At the end of March 2013, testing from **GSFC-ENPL** was switched to a new 10 gig server at Wisconsin (SSEC), with throughput usually over 3 gbps.

User flow was very close to the requirement, below last month's very high 414 mbps.

Testing from **NPP-SD3E** was also switched to Wisconsin's 10 gig server, in May, with throughput typically over 2 gbps! The integrated throughput from **NPP-SD3E** was above the NPP requirement by more than 3 x, so the NPP rating remains **Excellent**. It was also above the GSFC combined requirement by more than 3 x, so that rating also remains **Excellent**.

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. On 23 April, testing from **LaRC ANGe** was switched to the new SSEC 10 gig server; performance improved at that time. Thruput from **LaRC ANGe** is very noisy (with a 9.2 : 1 average best : worst ratio), but is well above the previous 7.9 mbps requirement; it would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago.

8) KNMI:Rating: Continued **Excellent**Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
OMISIPS → KNMI-ODPS	453.6	278.6	122.3	2.4	278.6
GSFC-ENPL → KNMI-ODPS	637.5	549.6	421.0		

Requirements:

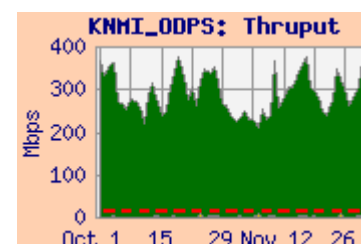
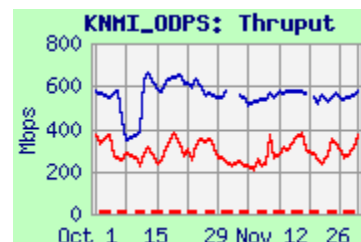
Source Node	Date	mbps	Prev	Rating
OMISIPS	CY'12 -	13.4	0.03	Excellent

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2+ x 10 gbps circuit to Frankfurt, then via Surfnets through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from **OMISIPS** on EBnet at GSFC to the ODPS primary server at KNMI. Thruput from **OMISIPS** has been noisy but mostly stable, with a 3.7:1 best : worst ratio. The median thruput remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 2.4 mbps this month, similar to recent months, but only 18% of the revised requirement.



9) JSpace - ERSD:

Ratings: **GSFC → ERSD: Continued Excellent**
ERSD → EROS: Continued Excellent
ERSD → JPL-ASTER-IST: N/A

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml>

US ↔ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → JSpace-ERSD	373.7	122.0	45.9	3.1	122.0
GES DISC → JSpace-ERSD	64.7	61.4	41.7		
GSFC ENPL (FE) → JSpace-ERSD	85.9	82.6	79.0		
GSFC ENPL (GE) → JSpace-ERSD	528.5	502.9	86.6		
JSpace-ERSD → EROS	179.8	114.3	45.7	3.2	114.3
JSpace-ERSD → JPL-TES	94.2	63.3	33.7		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → JSpace-ERSD	'12 -	6.75	5.4	Excellent
JSpace-ERSD → JPL-ASTER IST	'12 -	0.31	0.31	Excellent
JSpace-ERSD → EROS	'12 -	8.33	8.3	Excellent

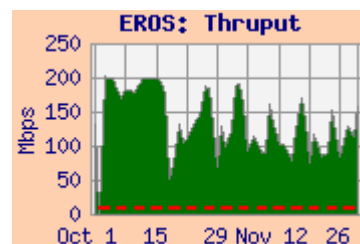
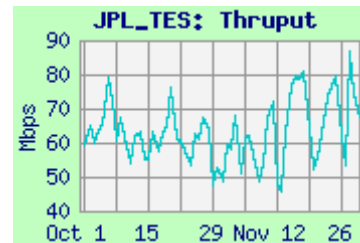
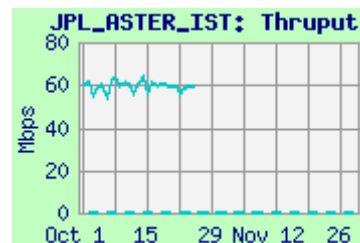
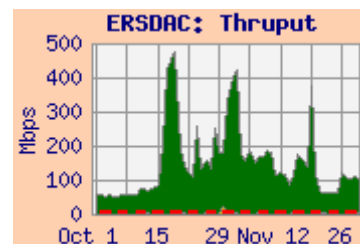
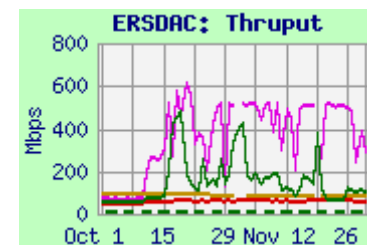
Comments: **GSFC → JSpace-ERSD:** The median thrupt to JSpace-ERSD from most sources improved in September 2011, when the connection from JSpace-ERSD to Tokyo-XP was upgraded to 1 gbps (from 100 mbps). Peak thrupt from **GSFC ENPL** is now often over 400 mbps.

Some nodes, however, (e.g., **EDOS**) had been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – so it initially remained limited by its HTB settings, and did not see much improvement. The **EDOS** HTB settings were raised in February 2013, resulting in much higher average performance, although it was also very noisy.

Thruput to ERSD dropped from all sources dropped and became very noisy in mid August. The POC reports that this was caused by very high levels of ingest (not from GSFC). Thruput recovered in early October. Median thrupt remained well above 3 x the reduced requirement, so the rating remains **Excellent**. The user flow was close to normal from GSFC to JSpace-ERSD this month, consistent with the requirement.

JSpace-ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October 2012. JPL no longer uses a distinct IST; instead, JPL personnel log in directly to the IST at JSpace-ERSD. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES would be rated **Excellent**.

JSpace-ERSD → EROS: The thrupt improved with retuning in October '11, after the ERSDAC Gig-E upgrade. Performance dropped in August, apparently due to the congestion above, and recovered last month. Thruput remains well above the reduced requirement (was 26.8 mbps previously), so the rating remains **Excellent**. The user flow this month was consistent with the requirement.

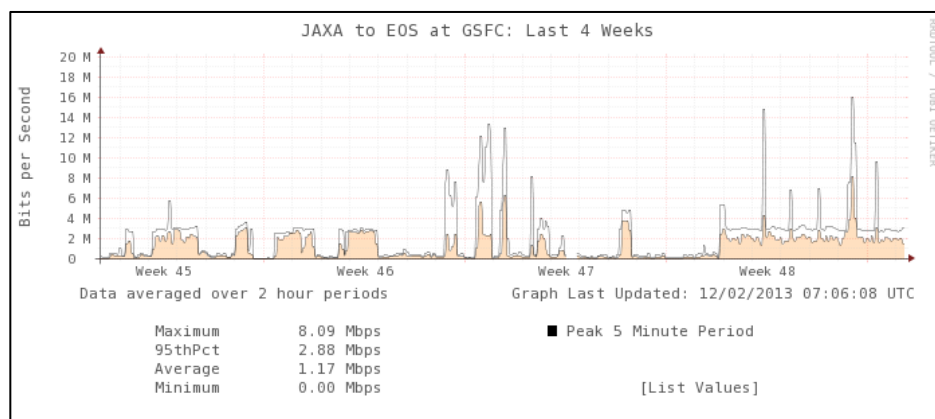
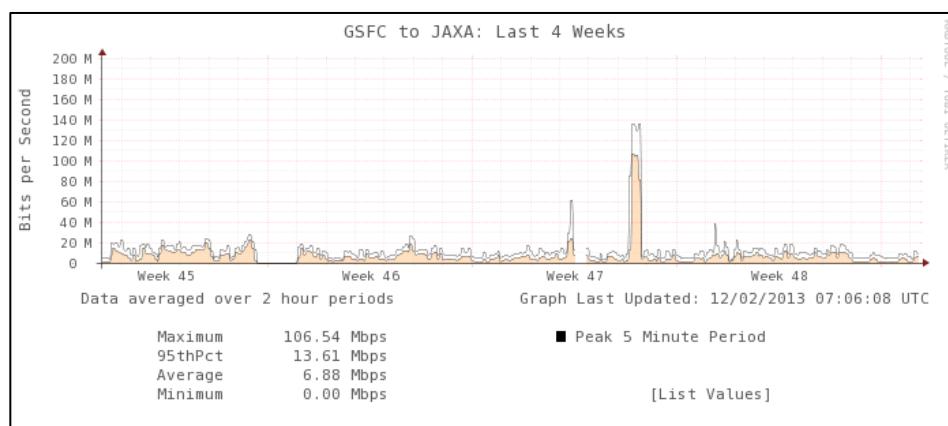


10) US \leftrightarrow JAXARatings: US \rightarrow JAXA: N/AJAXA \rightarrow US: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009. No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests – in preparation for GPM -- but has thus far declined to participate.

However, the user flow between GSFC-EBnet and JAXA continues to be measured. As shown below, the user flow this month averaged 6.9 mbps from GSFC-EBnet to JAXA, and 1.2 mbps from JAXA to GSFC-EBnet.

These values are above but mostly consistent with the new (database) requirements of 3.36 mbps to JAXA, and 1.31 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.



Note that thrupt from GSFC to the Tokyo Exchange Point (even with the drop in October) is well in excess of the JAXA requirements.

